

15¢

NOVEMBER 5, 1949

SCIENCE NEWS LETTER



TECHNOLOGY DE

ONDA

NOV 10 1949
DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE



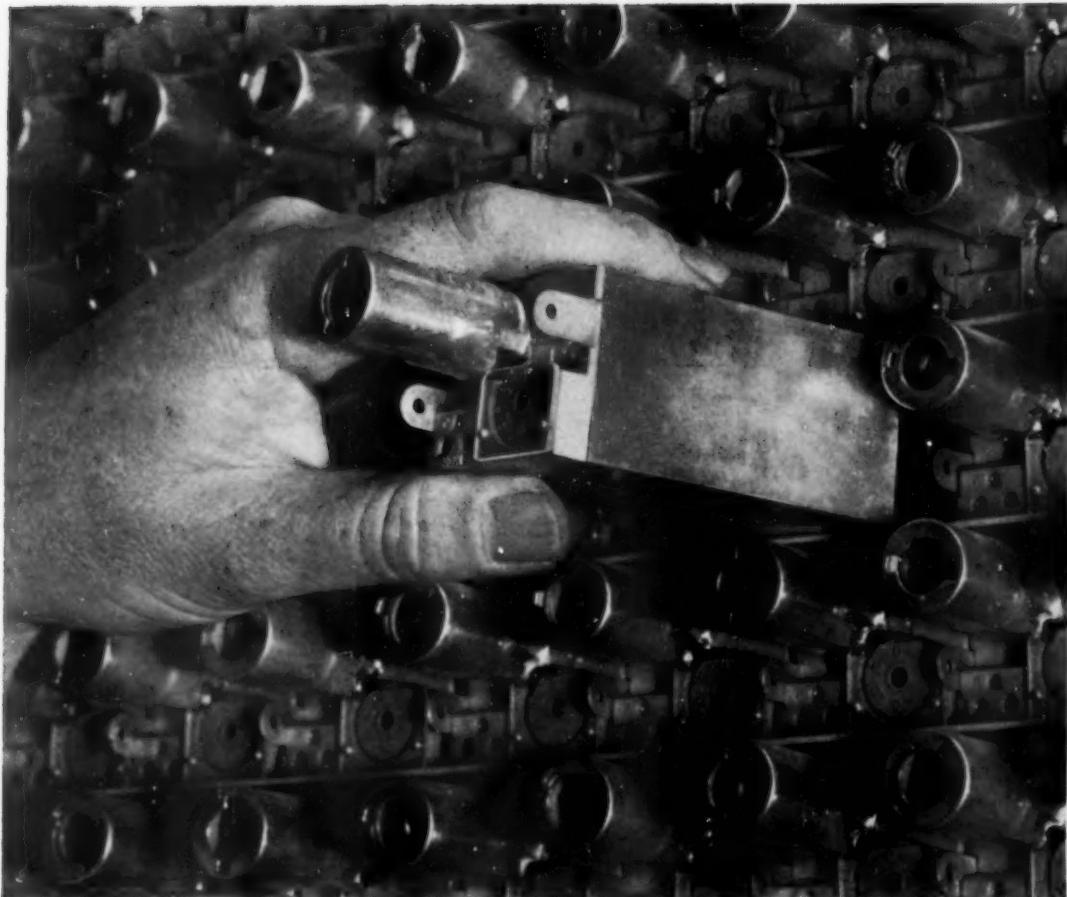
Unearthing Cosmic Rays

See Page 292

A SCIENCE SERVICE PUBLICATION

\$5.50 A YEAR

VOL. 56 NO. 19 PAGES 289-304



ANOTHER SCORE IN THE

battle of the inches

It takes many costly buildings to house your telephone system. Every inch saved helps keep down the cost of telephone service. So at Bell Telephone Laboratories engineers work constantly to squeeze the *size* out of telephone equipment.

In the picture a new voice frequency amplifier is being slipped into position. Featuring a Western Electric miniature vacuum tube, tiny permalloy transformers, and special assembly techniques, it is scarcely larger than a single vacuum tube used to be. Yet it is able to boost a voice by 35 decibels. Mounted in a

bay only two feet wide and $11\frac{1}{2}$ feet high, 600 of the new amplifiers do work which once required a room full of equipment.

This kind of size reduction throughout the System means that more parts can be housed in a given space. Telephone buildings and other installations keep on giving more service for their size — and keep down costs.

The new amplifiers, which will soon be used by the thousands throughout the Bell System to keep telephone voices up to strength, are but one example of this important phase of Laboratories' work.

BELL TELEPHONE LABORATORIES Exploring and Inventing, Devising
and Perfecting, for Continued Improvements and Economies in Telephone Service



MEDICINE

Pills To Ward Off Colds

Anti-histamine chemicals, used for many allergy conditions, are now claimed effective in checking colds. They are available without prescription.

► WARDING off a cold by taking a pill when you first feel the symptoms of a cold coming on is the promise now held out by drug manufacturers and by research reports, published and unpublished, from various parts of the country.

The pills which it is hoped will do this job of stopping the common cold, with its annual bill of billions of dollars and hundreds of millions of lost working days, will contain chemicals known as anti-histamines.

Results with up to 90% success in treating colds by these chemicals have been reported, and reports of even better results are about to appear.

The anti-histamines have been used to treat hay fever, asthma and other allergies, with both good results and failures reported. Until recently they have been sold only on a doctor's prescription. Two months ago (Sept. 2) one of them, with the trade-name of Neohetramine, was released for sale over the counter, without prescription, under the name, Anahist. Last month another of them, named Inhiston, went on sale over the counter.

Probably many others will be available this way within the next few months, since there are many anti-histamine chemicals made by different manufacturers. All of them doubtless will rush to file with the U. S. Food and Drug Administration new or amended new drug applications for over the counter sale of their products.

The American people may become eager guinea pigs this winter in large scale trials of some of these drugs, both as to the effectiveness and safety. Most of what has been known of the anti-histamine drugs so far has come from reports of their use in hay fever and other allergies.

Two limiting factors, one potentially dangerous, have shown up in the allergy studies with the drugs. These are: 1. The same drug that gives relief to one hay fever patient is ineffective in another, and there is no way of knowing without trying the drugs which will be effective in which patient. Whether this will be true in the use of the drugs for warding off colds has not yet appeared.

2. Drowsiness has been the chief unpleasant symptom coming from the use of anti-histamine drugs. This symptom has seemed to affect some patients more than others. It may range from mild to the serious state where sleep would overcome a person while driving a car or operating machinery, with consequent danger to the person taking the drug and to others.

The anti-histamine drugs now released

for over-the-counter sale for colds are said to have little or none of this effect in the amounts contained in the pills, if used according to directions.

ENGINEERING-AERONAUTICS

Hypersonic Wind Tunnel

► THE highest air velocity in a wind tunnel, ten times the speed of sound or approximately 7,600 miles per hour, is attained in a new tunnel now completed at the California Institute of Technology, Pasadena, Calif. It was designed and built for the Army Ordnance Department.

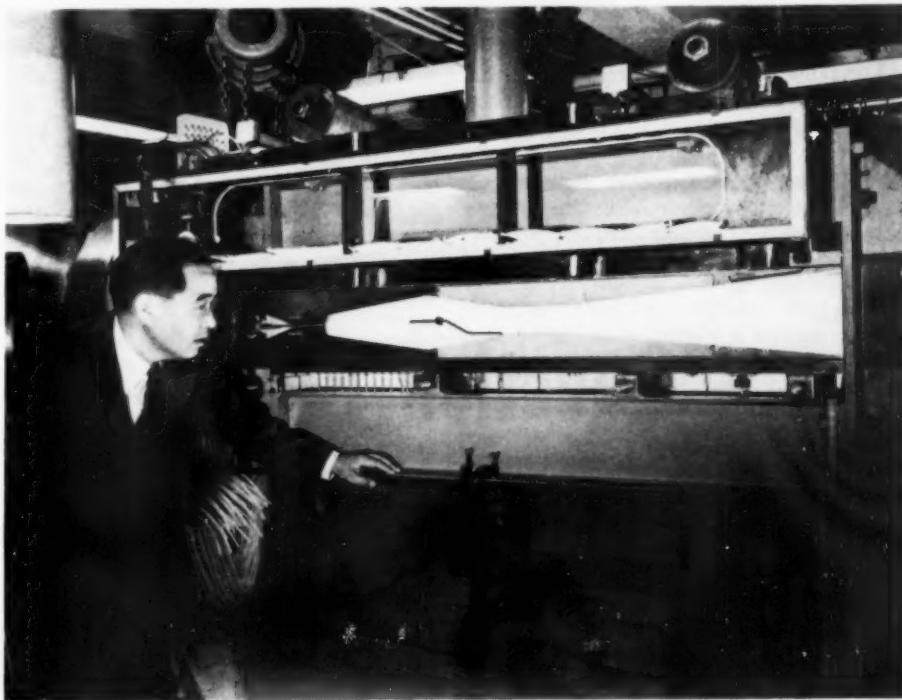
Previous highest known speed of air flow in supersonic wind tunnels was about seven times the speed of sound. This tunnel is needed by ballistic experts of the Army to develop guided missiles of extremely high speed. It will be used in studying what they call the inevitable intercontinental missiles of the future.

Basis for use of anti-histamine drugs in treating colds is the relatively new idea that a cold is an allergic response to the protein of the cold virus, somewhat as hay fever is an allergic response to the protein of plant pollens. Release of too much of the normal body chemical, histamine, in some persons in response to the protein, is believed the cause of the symptoms in hay fever and, according to the new theory, in colds. Anti-histamine chemicals should control or stop the symptoms by counteracting the histamine.

Science News Letter, November 5, 1949

An early use of this so-called hypersonic tunnel will be to obtain basic information about the design, performance and instrumentation of tunnels for extreme high speeds. Basic experimental data on shock-waves, boundary layers and the flow past models at hypersonic speeds will be obtained.

The test section of this tunnel, in which models of missiles are mounted, is five by five inches in size, although the entire test section stretches to an over-all length of four feet. To accelerate in the expansion section of the tunnel, air must pass through a slot in the throat of a specially designed



WORLD'S FASTEST WIND TUNNEL—Unprecedented speed in excess of ten times that of sound has been obtained in this wind tunnel. Dr. Henry T. Nagamatsu, Caltech director of the tunnel, is shown examining the test section.

steel alloy nozzle. A schlieren optical system is used to photograph the fast moving air as it speeds past the models in the test section.

The new tunnel is installed in the Guggenheim Laboratory of Aeronautics on the campus of the Institute in a building espe-

cially designed for it. A total of 15 compressors supply the air for the tunnel. The tunnel was designed by Dr. Allen E. Puckett, and will be operated under Army Ordnance contract by Dr. Henry T. Nagamatsu of the laboratory staff.

Science News Letter, November 5, 1949

ARCHAEOLOGY

Indians' Increase Traced

► THE ancient inhabitants of the Flagstaff, Ariz., area, who disappeared about 600 years ago, were once almost as numerous as the population today, thanks partly to a volcano which erupted beneficial water-retaining ash over a wide farming area.

Today there are about 10,000 people living in the area. In the year 1160 A.D. the vanished Indians reached an estimated peak of 8,416. Ninety years later the population had dropped to a mere 612, and a hundred years after that, in 1350, the pueblo dwellers had completely disappeared.

The rise and decline of the Flagstaff area prehistoric residents have been traced in their pottery remains by Harold S. Colton, president of the Northern Arizona Society of Science and Art. The ceramic record goes back to the year 500 A.D. when the population was 300. The rise was more or less slow until the year 1167 when volcanic ash falling from Sunset Crater suddenly increased the agricultural capacity of the area. The ash formed a black sand mulch which held the moisture in the soil.

The cause of this rapid decline from the high point of population, Dr. Colton believes, was poor sanitation and faulty agricultural methods which ruined the arable land.

To arrive at such precise figures and dates, Dr. Colton believes that "the archaeologist must have courage enough to take his feet off the concrete and soar into the

sky of speculation." His method, which is similar to the one he employed in an earlier study in 1936, is first to assign dates to the pottery which has been recovered from some 1,500 sites in the area. These dates are fixed with considerable accuracy by the tree ring method.

Then by estimating the number of inhabitants per pueblo or pit house for each time sequence, he draws up a population census which shows the slow climb to peak population and then the sudden drop into extinction.

Science News Letter, November 5, 1949

GENERAL SCIENCE

Scientists in U.S. and Europe on Equal Terms

► AMERICAN scientists are on about equal terms with their European counterparts as far as fundamental work is concerned, Dr. Robert H. Krieble of the General Electric Research Laboratory declared.

Returning from a European trip during which he inspected technical and scientific activities, Dr. Krieble declared that "European scientists are unusually original and imaginative, but are hampered by lack of suitable facilities." Scientists here lead the world in the application of technical knowledge, he noted.

Science News Letter, November 5, 1949

On This Week's Cover

► COSMIC ray particles which smash deep into the earth from outer space will be studied in this worked-out cavern 2,250 feet underground in the Cayuga Rock Salt Company's mine near Ithaca, N. Y. Lowell M. Bollinger of Cornell University is shown checking a cylinder of 48 Geiger counters and other cosmic ray recording apparatus in preparation for the experiment.

Science News Letter, November 5, 1949

SCIENCE NEWS LETTER

VOL. 56 NOVEMBER 5, 1949 No. 39

48,300 copies of this issue printed

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOrth 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change, please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Copyright, 1949, by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service. Science Service also publishes CHEMISTRY (monthly) and THINGS of Science (monthly).

Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C. under the act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C.; Pennsylvania 6-5566 and 360 N. Michigan Ave., Chicago. STATE 4439.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Edwin G. Conklin, Princeton University; Karl Lark-Horowitz, Purdue University; Kirtley F. Mather, Harvard University. Nominated by the National Academy of Sciences: Harlow Shapley, Harvard College Observatory; R. A. Millikan, California Institute of Technology; L. A. Maynard, Cornell University. Nominated by the National Research Council: Ross G. Harrison, Yale University; Alexander Wetmore, Secretary, Smithsonian Institution; Rene J. Dubos, Rockefeller Institute for Medical Research. Nominated by the Journalistic Profession: A. H. Kirchhofer, Buffalo Evening News; Neil H. Swanson, Baltimore Sun Papers; O. W. Riegel, Washington and Lee School of Journalism. Nominated by the E. W. Scripps Estate: H. L. Smithton, E. W. Scripps Trust; Frank R. Ford, Evansville Press; Charles E. Scripps, Scripps Howard Newspapers.

Officers—President: Harlow Shapley, Vice President and chairman of Executive Committee: Alexander Wetmore, Treasurer: O. W. Riegel, Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Jane Stafford, A. C. Monahan, Marjorie Van de Water, Lydia Schweiger, Ann Ewing. Science Clubs of America: Joseph H. Kraus, Margaret E. Patterson. Photography: Fremont Davis. Sales and Advertising: Hallie Jenkins. Production: Priscilla Howe. In London: J. G. Feinberg.

Question Box

ASTRONOMY

What may comet dust reveal? p. 294.

GEOLOGY-NUCLEAR PHYSICS

On what is the theory that the earth is getting warmer based? p. 294.

MATHEMATICS-ENGINEERING

How could a "fail-safe" mechanical librarian be developed? p. 295.

MEDICINE

For what discoveries was the Nobel Prize in medicine awarded? p. 295.

Photographs: Cover, Cornell University; p. 291, California Institute of Technology; p. 293, Signal Corps Engineering Laboratories.

What disease increases under poor housing? p. 297.

What kinds of pills are offered to ward off colds? p. 291.

NUCLEAR PHYSICS

How could the existence of a negative proton be discovered? p. 293.

PHYSICS

What unique kind of plastic film has been developed? p. 296.

NUCLEAR PHYSICS

Missing Particle Sought

Theory of the existence of a negative proton is based on the orderliness of nature as shown in the case of positive and negative electrons.

► WANTED: A missing atomic particle, the negative proton.

This missing particle look-out was broadcast by Drs. Julius Ashkin, Theodore Auerbach, and Robert E. Marshak, University of Rochester physicists, at the meeting of the National Academy of Sciences in Rochester, N. Y.

Because there are both positive and negative electrons, although only positive protons are known so far, the scientists suggest nature, to be symmetrical, should also have a negative proton. Such a particle might be detected by exposing photographic plates to cosmic rays at very high altitudes reached by balloons.

"Electrons have been known for a long time to exist in two different varieties of the same mass but opposite charge," the report said. "The more abundant electron has a negative charge and is found in atoms in the region close to but primarily outside the central nucleus. The less abundant positively charged electron is not a permanent constituent of the atoms as we know them but is produced in a variety of processes taking place in the nucleus or in the immediate surrounding region.

"When brought into close proximity the two may disappear or be annihilated in a single act, producing simultaneously two quanta of light. Thus a positive electron in the presence of matter containing negative electrons has only a transitory existence and eventually suffers annihilation.

"Protons so far found in nature are all of one variety. These particles, which form one of the fundamental constituents of nuclear matter, are of positive charge and of mass approximately 2,000 times the mass of an electron. They have in common with electrons the feature of possessing an intrinsic spin or angular momentum equal to one half a natural unit. This numerical identity in the spin has long since led to

speculation on possible further analogies between electron and proton. It is of interest to find out if a negative proton exists.

"A negative proton would be a particle of negative charge, of mass equal to that of an ordinary positive proton and capable of undergoing an annihilation process with the more abundant positive proton. For this type of annihilation process one finds by theoretical estimation that the most likely end products are two new charged particles known as mesons.

"The charge on these resulting mesons make their detection possible by the now standard technique of examining nuclear events in very sensitive photographic emulsions. Since the positive proton which is one of the partners in the annihilation event forms a part of the nucleus of an atom in the emulsion there will also be other charged particles emitted as a result of the shock of the annihilation. The mesons, however, will be moving with much greater speed than the emerging nuclear constituents and will leave noticeably different tracks, thinner than usual, in the photographic emulsion. One would therefore expect to find an explosive event in the emulsion which starts with the entry of a very fast charged particle, the negative proton, and results in the production of only two fast moving charged particles, which are mesons, accompanied by some number of slowly moving charges.

"Because of the necessity to conserve momentum in the annihilation event the three fast tracks would all lie in the same plane forming an inverted Y-shaped figure with the angle between the two mesons somewhat greater than 90 degrees on the average. If this characteristic phenomenon were found in photographic plates we would have evidence for the existence of the negative proton."

Science News Letter, November 5, 1949



RADAR WEATHER TOWER—
Advance storm warning is obtained by this detector at the Signal Corps Engineering Laboratories, Fort Monmouth, N. J.

and civilian weathermen in studies of weather movements and in forecasting.

Tower-mounted, this new installation has a wider range than other ground-based equipment but, more important, the equipment used has been arranged to accentuate the storm signals and to permit their detection at relatively great distances. Earlier radars had a tendency to pick up signals from nearby rainstorms, thereby masking indications from enemy targets on the far side of such storms.

This apparatus consists of a high-power transmitter, a large eight-foot parabolic antenna, and a sensitive radar receiver. The signals received from any storm area within range of the radar can be displayed on several types of oscilloscopes which contain cathode ray tubes similar in appearance to those on television receivers. The signals can "paint" electronically a picture similar to a relief map of the area or give a vertical cross-section of the storm.

In both cases the radar set introduces its own "scale of miles" on the map so that the operator can quickly and simply estimate the distance of the storm from his station. Satisfactory operational tests have already been made with the new installation.

Science News Letter, November 5, 1949

Electric generators at Grand Coulee Dam in Washington state will have a combined capacity of 2,000,000 kilowatts when all 18 are installed; 10 are already in use.

About 60% more turkey poult were hatched in the United States this year than in 1948, which means that turkeys should be plentiful for the coming holiday markets.

METEOROLOGY

Radar Spots Coming Storm

► STORM areas six to eight hours away may be detected by special radar equipment mounted atop a 100-foot tower at the Army Signal Corps engineering laboratories, Fort Monmouth, N. J. This new radar is designed to give weathermen and pilots warning of storms within a 200-mile radius.

The detection of storm clouds far beyond

normal vision by radar is not new. That such clouds will reflect radar pulses back to the transmission antenna of the radar equipment, which also acts as a receiver, was first noticed by observers on radar-equipped B-29s en route from Pacific islands to bomb Japan during the war. Since then radar has been used both by military

GEOLOGY-NUCLEAR PHYSICS

Earth Is Getting Warmer

Contradiction of the theory that the earth is cooling off is based on the amount of radioactivity measured in meteorites.

► CONTRARY to the popular belief that the earth is cooling off, it actually is warming up.

Dr. Harold C. Urey, University of Chicago distinguished service professor of chemistry and Nobel-prize winner, advanced a new theory on the origin and development of the earth at the meeting of the National Academy of Sciences at Rochester, N. Y. His "warming-up" hypothesis is based on the amount of radioactivity measured in meteorites.

Heat at the earth's center is generated in part by the dropping of the metallic components toward the center, but largely by radioactivity. Since it is impossible to penetrate far enough into the earth's center to determine the heat, the temperature has been calculated by measuring the radioactivity of meteorites, which are believed to be similar to the earth's core.

The earth was formed, according to Dr. Urey's chemical hypothesis, from a conglomerate of metallic iron and rock. The iron, melted by the heat during a period of more than a billion years, fell to the center of the earth to form the earth's core.

The earth's crust, affected by this phenomenon, was formed into mountain ranges. As more metal moves from the outer crust to the earth's core, at intervals of approximately 200,000,000 years according to Dr. Urey's estimates, other mountain ranges will be formed.

The more common belief on the development of earth, had been that the iron of the earth sank to the center while the earth was very hot. It was believed that the iron formed the core of the earth and the solidification of the crust of the earth began from the core outwards, with convection in the molten earth being the effective means for the transfer of heat.

"If radioactivity found in the surface rocks is representative of an average sample of the whole earth," Dr. Urey said, "comparatively rapid heating of the earth must result."

Rough calculations show, he points out, that the gravitational energy stored which would be dissipated in the formation of the present core of the earth is greater than the radioactive heat that has been generated in two billion years from all radioactive materials. The iron flowed to the center of the earth through channels opened by the wetting of the stone phase by the iron phase, generating a large amount of heat. This leads to convection in the outer mantle

of the earth and the formation of mountains.

Metallic iron also played an important role in the formation of the earth's atmosphere and similarly in determining the atmospheres of Mars and Venus according to the Nobel-prize winner.

With a somewhat lower temperature for Mars and a somewhat higher temperature for Venus, he accounts for the water and carbon dioxide supplies of the minor planets.

Dr. Urey also accounts for the difference in density of the moon and earth by postulating a decreasing temperature between the beginning and final phases of the formation of the earth and her satellite so that iron was not in the initial preplanetary

cloud but was present in the final cloud. Earth, 80 times larger than the moon, accumulated the iron particles faster than the moon.

The hypothesis of the metallic state leads to an initial structure of the earth with a core of moon-like material surrounded by a layer of silicate and iron phase.

The core did not move for some billion years until the radioactive heat melted the iron and decreased the solidity of the silicates of the original solid earth.

Dr. Urey suggested that the primordial core rose to the surface during the Pre-Cambrian times (more than one and a half billion years ago) and first produced continental land and probably the Pacific basin, and now forms the outer iron fore-mantle of earth some 230 miles thick.

The iron of the primordial mantle moved to the interior, producing increased temperatures at depth which generated convection currents, which have produced folded mountains, continental drift and glacial periods. The same phenomena, he believes, are taking place on Mars, but in a less modified status.

Science News Letter, November 5, 1949

ASTRONOMY

Comet Dust Sifts to Earth

These fragments promise to yield valuable data on matter from outer space. A world-wide search for them was suggested.

► SIFTING into the earth's atmosphere at about 850 miles per hour or less are little fragments of comets that promise to give astronomers valuable samples of matter from outside the earth.

Dr. Fred L. Whipple of Harvard College Observatory, Cambridge, Mass., told the National Academy of Sciences meeting in Rochester, N. Y., about these "micro-meteorites" which are so small that they can smash into our air without being burned to nothing.

A world-wide search for this meteoric dust was suggested. It could be captured in the upper air through airplane flights, recovered from melted snow of remote polar regions or discovered in the depths of the ocean or layers of the earth formed in past geologic ages.

These particles are very small, the largest being about a ten-thousandth of an inch. Because they are so tiny their large surface compared with their weight allows them to get rid of the heat that is caused by hitting the air molecules. Thus they do not burn in a flash of light like the larger meteorites seen in the night sky. They fall to earth as fine dust.

The comet dust can be identified because it is sharp edged instead of being rounded like volcanic material, wind blown particles

or fine material from power plants and other earthly fire. Even the small fragments of the larger meteorites or fireballs should be fused and smooth.

Investigations have been made so far on micro-meteorites by Drs. D. K. Norris and Frank Hogg of Toronto and Dr. H. E. Landsberg of the U. S. Weather Bureau.

There is hope, Dr. Whipple said, that micro-meteorites found in the geological layers can tell us about the history of the solar system. He suggests that deposits of the Cretaceous era should be searched for evidence as to whether the solar system was filled then with more fragments of planets and other cosmic material, as some astronomers have theorized.

For his researches on meteorites, Dr. Whipple was presented with the J. Lawrence Smith medal of the National Academy of Sciences, one of the highest awards of American science.

Science News Letter, November 5, 1949

In the 20-year period from 1926 to 1946, some 6,500,000 acres of America were planted in forest trees by public and private agencies and individuals; about two-thirds of these planted acres are classed as successful.

MEDICINE

Honor for Brain Findings

Nobel Prize in medicine honors scientist who discovered the sanity-restoring brain operation, and researcher who discovered brain stem role in sleep.

► BETWEEN 7,000 and 8,000 mental patients in the United States have had the sanity-restoring brain operation "first conceived and executed" by Dr. Egas Moniz, Portuguese medical scientist who shares this year's Nobel Prize in physiology and medicine with the Swiss brain researcher, Dr. Rudolph Walter Hess.

Dr. Hess is known for his discovery that sleep can be induced by electrical stimulation of part of the brain stem known medically as the hypothalamus and sometimes popularly called the seat of the soul. His studies showed that this particular region of the brain has an active role in bringing on sleep and also in promoting the unconscious activities relating to growth and body nourishment which go on during sleep. Dr. Hess is director of the physiological institute of the University of Zurich.

The operation Dr. Moniz devised is known as prefrontal lobotomy. It consists in cutting connections between certain cells in the front part of the brain. The idea of destroying something in the brain to help a patient with a disordered mind came to Dr. Moniz while attending a conference in

London on defects that resulted from injuries of various kinds to the brain.

The number of cells in the brain is fixed and they show no change in mental disorder. The connections between the cells, however, are changeable and are extremely variable in the normal person. In mentally sick persons, Dr. Moniz reasoned, these connections are stabilized in an abnormal way. Ideas of persecution, delusions, anxieties develop and persist. Disturbing the brain connections, he thought, would free the patient from his morbid mental activity.

Before developing his brain operation, Dr. Moniz had developed a safe way of making the brain's arteries visible in X-ray pictures.

During and after the first World War, Dr. Moniz turned from medical research to serve as his country's foreign minister. His scientific work was interrupted again in 1939 when a homicidal maniac pumped six bullets into him.

His brain operation was first introduced into this country by Drs. Walter Freeman and James W. Watts of George Washington University, Washington, D. C.

Science News Letter, November 5, 1949



DR. EGAS MONIZ

developed by the Zator Company in Boston should be used. Called "Zatocoding", the method is already in use in punched card information systems. With this system, he said, it is essential that a truly random code be assigned to each recorded idea, and then these codes be used for selection. This method, in its use of statistical principles of random codes to guarantee the desired results, has its analogue in certain of the most advanced radio communication systems which also use a statistical principle to get the message through with the utmost reliability and economy of equipment.

Used in the UNIVAC, the Zatocoding method would give a fail-safe system for information finding with all the wanted information coming out. If there is a statistically-possible wrong selection, then this "failure" would result in extra information, rather than missed information.

As an electronic librarian, a UNIVAC machine could easily supervise a collection of 10,000,000 books, about the number listed in the Library of Congress. You would specify what you wanted with any combination of up to 20 cross-reference ideas. Put into the UNIVAC, Dr. Mauchly said, these ideas would then direct the search at a rate of 150 items per second, and the whole collection would be scanned completely for you in 20 hours. Since the UNIVAC as now designed has a mathematical brain, instead of a specialized "library" brain, he said this performance could be speeded up by at least 10 times with slight changes in equipment.

Science News Letter, November 5, 1949

MATHEMATICS-ENGINEERING

No-Slip Library Machine

Mechanical librarians must be "fail-safe" to prevent information being missed. Need a device to insure more information rather than less in event of failure.

► ELECTRONIC mechanical librarians of the future must be "fail-safe" if scientific progress is not to be bottle-necked by lost and misplaced information. When the scientist of tomorrow in his laboratory needs information from the record, a machine librarian must be able to find everything relevant. It must be "fail-safe" and not miss information, Dr. John W. Mauchly, the co-inventor of the ENIAC and other electronic computing machines, told a recent meeting of the Chemical Literature Division of the American Chemical Society.

Railroad lights which turn a safe red when something fails in the system, or electronic computing machines which quickly stop before making mistakes if a tube burns out, are both designed to be fail-safe. The same principle applied to a library machine-searching system will insure, in spite of minor failures due to

quirks of languages or of the classification system of the machine, that the essential information stored in the system will come out safely and will not be lost or passed over. Any slips or failures of man or machine must then cause more information rather than less to come from the searching system.

How to do this with the versatile UNIVAC electronic computing machines, six of which are now under construction by the Eckert-Mauchly Computer Corporation in Philadelphia for government and private users, was explained by Dr. Mauchly. In the first place, the UNIVAC is fail-safe against tube and electrical type of failures by its circuit design.

To make the UNIVAC fail-safe in the searching for recorded thoughts or ideas, Dr. Mauchly pointed out that the superimposed random or "probability coding"

Oysters contribute nutritive value to the diet as well as being flavorful; they are an excellent source of proteins, minerals and vitamins.

MEDICINE

Cancer Fight Helped By Mirror Microscope

► CANCER fighting is now being done with mirrors, lenses, and invisible ultra-violet and infra-red light rays. They are being used, in special microscopes, for seeing more of what goes on inside the cancer cell, what special chemicals it needs for its diet, and what chemical changes in normal cells may be linked to the start of cancer.

A new microscope lens for this kind of cancer fighting, developed by David S. Grey of the Polaroid Corporation, was demonstrated at the meeting of the American Cancer Society in New York. Development of lens was sponsored by the Office of Naval Research. It is being manufactured by Bausch and Lomb Optical Company and is already in use at two research centers.

Science News Letter, November 5, 1949

CHEMISTRY

Wartime-Like Aerosol Bomb Has Many Peacetime Uses

► THE aerosol bomb, which acquired fame during the war because of its effectiveness in killing insect pests, in a modified form is now serving the civilian population in applications ranging from paint sprayers to fire extinguishers, and even for dispersing whipped-cream to tasty foods.

The civilian bomb is a low-pressure type. The wartime insecticidal bomb was a high-pressure affair, and costly because strong containers were needed. Low-pressure containers are cheap enough to discard after use. They work on the same principle, however, being compressed-gas containers. Aerosol is a scientific term for a suspension of fine particles in the air.

Reports on aerosol research, and a list of trade-literature on low-pressure aerosols, designated as D1 and D2 respectively, are now available from the U. S. Department of Commerce, Office of Technical Services. Requests for them should include the "D" designation. A bibliography of published references on aerosols may be obtained from the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture. As insecticides, aerosols have practically revolutionized such fields as green house culture, it is pointed out.

Science News Letter, November 5, 1949

GENERAL SCIENCE

"Dimpled" Golf Balls Give Longer Drives

► DIMPLES in your golf balls give you a longer drive and better control over where the ball will go. Golfers may have claimed this for a long time, but now the scientists have proved it is so.

Spinning golf balls dropped through a wind stream were studied by John M. Davies at the B. F. Goodrich Company wind tunnel in Akron, Ohio. Driving tests by a machine that hit the ball with a mallet-type club were also made, giving results which were consistent with the wind tunnel tests.

Smooth, mesh, standard dimple and bramble (protruding dimple) balls were tested by dropping them through a wind stream where the air had a speed of 105 feet per second. Height of the fall was varied from a little over one-half foot to somewhat under one and one-half feet.

Values of the drag and lift which determine the path of the ball, were obtained by spinning the balls first in one direction then in the other. These showed the effects of dimple and mesh markings to be very similar.

Club speed and face angle of the mallet-type club were varied for the different types of balls. For the dimple balls, the distance the ball covered and the flight path varied with the club face angle as might be expected. With the smooth balls, however, neither the distance nor the flight path of the ball changed much with the mallet variations.

Science News Letter, November 5, 1949

GEOLOGY

Coal Reveals Plant Cells In New Microscope Method

► A NEW method of preparing specimens for the electron microscope reveals the cell structure of the ancient plants that went into the formation of coal.

The new technique consists in taking a plastic impression of the surface of a polished cube of coal, and then photographing the impression through an electron microscope. The older technique of peeling or slicing thin sections of coal gives specimens which are too thick for profitable study. The plastic replicas are about one-tenth of a micron, the desirable thickness.

Outlining the method in ECONOMIC GEOLOGY (Nov.), J. T. McCartney of the Pittsburgh station of the U. S. Bureau of Mines says that the coal cubes, about the size of large dice, are polished and then placed briefly in an etching bath of chromic acid-sulfuric acid. After washing and drying in filtered air, they are dipped in a solution of polyvinyl formal. Over this a second layer of film, nitrocellulose, is applied. When dry, the double film of polyvinyl formal and nitrocellulose is stripped off. This film, bearing an impression of the coal's surface structure, is photographed through the electron microscope.

Dr. McCartney believes that these studies will reveal more clearly some of the finer details of coal structure that are not yet fully understood.

Science News Letter, November 5, 1949

IN SCIENCE

PHYSICS

Reveal Plastic Film that "Combs Out" Heat Waves

► INVENTION of a plastic film that "combs out" heat waves and allows their use in secret signalling and enemy detection was revealed to the Optical Society of America meeting in Buffalo, N. Y., after six years on the military secret list.

A research team from Polaroid Corporation, consisting of R. P. Blake, A. S. Makas and C. D. West, told how they developed during the war this first polarizer for infrared rays in convenient sheet form. Applications in scientific research and industry are expected for this simple polarizing device for the long invisible heat waves. Cumbersome reflecting plates were used previously.

Film polarizing visible light is made in large quantity and has many applications, including sunglasses that screen out scattered light causing glare. The heat-rays orienting film is made by combining two treatments used in making two types of polarizing film for visible light. A polyvinyl alcohol plastic stretched to align its molecules is first treated with iodine and then dehydrated.

The film makes "optical slots" that let the rays pass in one position and shut them off when turned at right angles.

Science News Letter, November 5, 1949

ENGINEERING

Quarry Rock-Blasting Better with Timed Delays

► ROCK blasting in quarries is found to give improved breakage, less vibration and to decrease claims for damages when the explosions follow one another in a tiny fraction of a second rather than occurring at the same instant.

This new system of blasting was explained to the National Safety Congress in Chicago, by D. M. McFarland, Atlas Powder Company, Wilmington, Del. The split-second delay blasting, he said, is meeting ever-widening acceptance in the industry because of the improved results it offers.

The introduction of millisecond delays, he said, in addition to improving breakage and backbreak in multiple row quarry blasts has also produced a noticeable decrease in the noise from such blasts and vibration effects were diminished. The system is suitable for use in mining, in his opinion, but miners will have to be taught its advantages and how to use it before it can come into general use.

Science News Letter, November 5, 1949

SCIENCE FIELDS

MEDICINE

Housing in Oak Ridge Greater Threat than Bomb

► THE health of workers at Oak Ridge, Tenn., was more endangered by poor housing conditions than by the atom bomb.

A study which revealed a five times greater rate of meningitis, serious brain and spinal cord disease, among people living in the hurriedly constructed homes on the project, was reported in New York. It was conducted by Dr. Bernard M. Blum, director, the Fife-Hamill Memorial Health Center, Philadelphia, and William F. Elkin, statistician, health physics division, Oak Ridge National Laboratory.

Meningococcal disease was 14 per 100,000 population among persons living in standard housing but increased to 79 per 100,000 among people in sub-standard housing or slums, Dr. Blum told the American Public Health Association.

Negroes were stricken more often than white people, 174 per 100,000 as against 64 per 100,000. This confirms the findings of other studies showing their greater susceptibility.

Men were found almost three times more liable to be attacked by the disease than women, although the difference in rate was smaller between boys and girls.

Dr. Blum attributes the greater exposure to chilling and fatigue among the adult men workers for this difference.

The study was made to find the effect of the slum areas on the rate of meningitis. Oak Ridge was especially suited for the study because inhabitants of the slum areas were often people of professional standing and not necessarily in the low income bracket. This revealed that their health was dependent on their environment rather than on their economy.

Science News Letter, November 5, 1949

AERONAUTICS

Pre-Heat System in Plane Engine Beats Arctic Cold

► FAR-BELOW-zero weather failed to prevent easy engine starting on an Air Force Boeing B-59 Superfortress with a special self-contained engine pre-heat system in recent cold weather tests in the Arctic region, it was revealed by the Boeing Airplane Company, Seattle, Wash.

To adapt the giant plane for operation in extreme low temperature, several modifications were made. In addition to the engine pre-heat system, cold-starting accessories, a new oil dilution system and many other refinements were made. Included in

the installation were 640 separate thermocouples, electrical thermometers, to record temperatures in all parts of the plane.

Principal modification was the use of the plane's standard combustion-heater wing anti-icing system to pre-heat all four engines prior to flight. This was accomplished by covering the propeller hubs and cowling entry ducts and diverting the hot anti-icing air into the engine compartments. When the engines reached a temperature for normal starting the covers were removed by ground crews.

The new oil dilution system employed was designed to prevent pump failures during the cold starts. Gasoline used to dilute the oil at low temperatures evaporates and is filter-removed from the system within ten minutes of engine starting. The thermocouples used kept an accurate record of temperatures at such locations as oil and hydraulic tanks, wing, body and engine nacelles. They also recorded temperatures in crew-carrying compartments.

Science News Letter, November 5, 1949

MATHEMATICS-ENGINEERING

Zero Location Important In Electronic Problems

► WHETHER or not your telephone connection shrieks like a wild banshee, or a radar gun-pointer goes completely off its rocker and shoots friends instead of enemies, all depends upon the location of "zeros".

A new book to help engineers and scientists to cope with the crucial problems of "stability" of electrical, electronic, and mechanical devices has just been brought out by Prof. Morris Marden of the University of Wisconsin in Milwaukee, and published by the American Mathematical Society, New York (\$5.00). Since Prof. Marden's book stresses the location of the zeros, it has the title *THE GEOMETRY OF THE ZEROS OF A POLYNOMIAL IN A COMPLEX VARIABLE*.

What matters is the location of these zeros, the "roots" of the polynomial equation that describes the device in question. For instance, in a telephone system, if the zeros are all to the left of the central axis when plotted out in the complex plane, then the telephone amplifiers will amplify the voices instead of going into an uncontrolled howling.

The book is expected to be important to engineers and applied mathematicians who have to work with all sorts of control mechanisms and "feed-back" circuits. For them and for the general mathematical reader, it will collect results in this important field—which is 115 years old, and still rapidly developing—into one convenient book. By getting the important results all in one place, the book is expected to help avoid future duplication of old work, a serious problem in science, and to facilitate further progress in this field.

Science News Letter, November 5, 1949

MEDICINE

Vitamin E May Stop Blindness in Early Babies

► VITAMIN E is showing promise of checking a disease causing blindness in premature infants, Drs. William Councilman Owens and Ella Uhler Owens, of Johns Hopkins University Medical School, Baltimore, Md., told the American Public Health Association in New York.

The blinding disease is retroental fibroplasia and is similar to congenital cataract but differs from it in that there are blood vessels in the membrane film located behind the crystalline lens of the eyes.

Drs. Owens found that the disease strikes about 15% of infants weighing three pounds or less. Earliest signs of the disease appear when the babies are about four weeks old and the disease process is usually complete by the time they are four months old.

Although the cause of the disease is still unknown, Drs. Owens believe it may be tied up with metabolism. They reason that when the first signs of the disease appear it is at a time when the infant, due to physiological immaturity, may be unable to meet the body's nutritional requirements from the diet he gets.

Premature babies are usually given vitamins A, D, and K to supplement their dietary needs. Drs. Owens have added vitamin E to their diets, beginning the first week after birth with very encouraging results. However, they caution, there is no successful treatment once the disease has taken hold.

Science News Letter, November 5, 1949

VETERINARY MEDICINE

No Record of Russian "First" on Cattle Vaccine

► SCIENTISTS in Washington have searched the literature in vain looking for the name of the Russian who Moscow claims produced the first foot-and-mouth disease vaccine.

Modern vaccine, like that being used in the current campaign against the disease in Mexico, is based on work done by Sven Schmidt of Denmark and Otto Waldmann of Germany in 1937 and 1938. Experts on the cattle disease failed to find any reference to an earlier Russian discovery in the U. S. Department of Agriculture library.

The only clue to the basis for the Russian claim is the fact that the Isle of Rheim off the German Baltic coast where Waldmann pursued his researches is now part of the Russian-occupied zone. One scientist suggested the possibility that Russia is exercising "retroactive dominion" over the scientific work done on the German island. Waldmann himself is now living in Argentina.

Science News Letter, November 5, 1949

POPULATION

1950 Is Census Year

Next April is set for the taking of the regular 10-year count of the population. Latin American representatives are being sent here for training.

By MARJORIE VAN DE WATER

► YOUR Uncle Sam is now completing plans for making his regular decennial count of all his many nephews and nieces.

Some time next April the census taker will knock on your door and will ask you a series of questions. You and your husband or wife (if you have one) will be counted and so will all the children down to the youngest infant in arms.

Better ask him to come in and sit down when he arrives at your house, because he will come armed with lots of large sheets of paper in a portfolio. And it is pretty hard to stand on a porch or in a field in the wind and fill out all the places on those big forms. They can and will do it, but it is much nicer for the census taker if he can spread things out on your dining table or living-room sofa.

The papers are much more formidable than are the questions themselves. You will probably be surprised at how quickly he gets his information and the interview is over. The average is about 15 minutes to take down all the information about your name, age, sex, race, whether you are married, single, widowed, divorced or separated, place of birth and whether you are working or unemployed.

Districts Assigned

Uncle Sam is sending an army of these census takers into the field. Each is assigned a certain district and is supplied with a map showing the boundaries of his assignment. He has instructions to count every man, woman, and child within those limits. The size of the district is arranged so that he can make his complete count and be done in about two weeks. Experience has shown that he will be able to count about 1000 persons in that time. Since the total population is estimated to be about 150,000,000, between 140,000 and 150,000 enumerators will be required for the job.

Your enumerator will have been specially trained for his work before he calls on you. If you live in a city, he has gone to school for one day, and then has gone out for a day of practice in census taking. And then, having faced a sample of the problems he will encounter, he goes back for another day of training. The enumerator who will work in the country will have a second day of counting, followed by a third day of training. That is because his work is complicated with the agricultural census

that is being taken at the same time as the population census.

In addition to the information that is gathered for every man, woman and child in the nation, additional questions will be put to a sample of the population. This sampling is done in a different way from that used by the election pollsters, and a way that is believed by Census officials to be more accurate.

Election polling is done by the quota system, which works like this. The interviewer is instructed to start from a certain corner and talk to people until he has interviewed a certain number having the required age, sex, and other important characteristics. Unconsciously, he may pick a biased group because of the fact that certain people are not at home, or at work, at the time the interviews are conducted or because the interviewer selects people he thinks he would like to talk to and so gets a group somewhat like himself in social or economic class.

The Census instructs the enumerators to ask questions about housing, for example,

in every fifth house or of every fifth person seen, covering his entire district in this way. If he is asking in every fifth house and they are not at home, he goes back until he finds someone. Thus, it is believed a fair cross-section of the nation is reached.

If you are that "fifth" person, you will be asked where you lived a year ago; the country of birth of your parents; what language, other than English, was spoken in your home when you were a child; and, if you were born outside the United States, about your citizenship.

Housing Questions

Housing questions to be asked of every fifth occupied house include the following: Do you have electric lighting? Do you have a radio? What kind of refrigerator do you have—electric, gas, or ice box? What kind of stove? What fuel do you use for cooking? For heating?

When the census taker has completed his task, then the real work begins in Washington. The information must all be translated into a code and cards must be punched with holes corresponding to the coded information, a card for each person. At the peak of production more than 1,000,000 cards will be punched and verified each day.



YOU'LL BE COUNTED NEXT APRIL—Information about your name, age, sex, race, whether you are married, single, widowed, divorced or separated, are among some of the things you will have to answer when the census taker comes your way.



SORTING INFORMATION—Facts obtained from you will be punched according to a code onto a card, which will be run through machines like this to sort them.

At one time it was hoped that a "document sensing machine" could be used to punch the cards automatically. Under this plan the census enumerators would make use of a special metal pencil to fill out the questionnaires. These metallic marks would later be "sensed" by the machine which would punch the cards to correspond.

Flaw in Trial Censuses

First flaw was detected in trial censuses. The special pencils turned out to be a nuisance. In the first place, the ink leaked on the enumerator's shirt pockets and got on the dresses of the ladies interviewed. But more important, when the enumerator had asked his questions and was all ready to take down the answers, the pencil would go on strike and refuse to write. But that was not all. To go through the machine properly, the questionnaires must all line up perfectly, and paper of the size used in the questionnaires shrinks and stretches with changes of weather in Washington so that it cannot be kept perfectly aligned.

Thus, the main reliance will still be on the army of key punch operators to make the cards that will go through the tabulators.

The cards are sorted and resorted and totals are made for each age, sex, race and other item of information collected. The information is then printed in big tables, ready to go to the printer. All this work is done automatically by machine.

Principal new thing about the 1950 census will be a change in the definition of rural and urban population. In 1940 persons were listed as city dwellers only if

they lived in places of 2500 inhabitants or more that were regularly incorporated. But around each of our large cities there is a suburban fringe that is not within the city limits. Those living in this suburban fringe were listed in the 1940 census as non-farm rural population. In 1950, boundaries will be established for the suburban fringe around the cities of 50,000 or more inhabitants and all the people living in this area will be classified as urban population. In addition, those towns of 2500 population or more, but which, for one reason or another, have never been incorporated will be counted in with the incorporated cities as urban population.

Definition of "Family"

The definition of a "family" will also be slightly different for the 1950 census. In 1950, all the related persons living in the same home will be considered as a single family, even though there may be more than one married couple living together in the household.

Some of the information that is to be obtained from only a sample 3 1/3 per cent of the population is that pertaining to length of marriage and fertility. The selected married persons will be asked if they have been married more than once and how many years they have been married. Women will be asked the total number of children they have ever borne.

To the Census, all people who have children are married. There is no tabulation of unmarried people with children.

In 1950, for the first time, Uncle Sam will have the company of all his Latin American neighbors in making the census. Agreement has been reached on what information to record for each person and how to tabulate it, so that for the first time, comparable figures will be available for all the Americas. Argentina is the only country not making a census in 1950, and that is because she just made one in 1947 and is still busy with the tabulation work.

Latin American countries are sending their statistical experts to this country for training in our National Office of Vital Statistics, Bureau of Agricultural Economics and Bureau of Labor Statistics, all bureaus concerned with the census. In addition all these trainees will receive a four-month course of training in the Census Bureau. By next Jan. 1, 200 persons will have received this training. In addition, consultants are going from the United States to visit Latin American countries and advise them. For some of our neighbors, the 1950 census will be their first experience with an enumeration of their population.

In counting the indigenous people living in the almost inaccessible regions of the Amazon valley in Brazil or the unexplored wilds of the Paraguayan chaco, the census taker will face unparalleled difficulties.

In many parts, there are no towns, no

PHENOMENA, ATOMS AND MOLECULES

IRVING LANGMUIR

The Philosophical Library deems it a privilege to announce the forthcoming publication of Dr. Langmuir's work PHENOMENA, ATOMS AND MOLECULES. The eminent scholar, winner of the Nobel Prize and one of the country's pioneers in atomic research, has set down in this volume many of his thoughts, observations and conclusions.

PHENOMENA, ATOMS AND MOLECULES exists on two levels: *The first section of the book deals with such general problems as "Science, Common Sense and Decency," "Science Legislation," "World Control of Atomic Energy."*

The second part of the book deals with such technical, scientific problems as "Surface Chemistry," "Flames of Atomic Hydrogen," "Forces Near the Surfaces of Molecules," "The Evaporation of Atoms, Ions and Electrons from Cesium Films on Tungsten," "The Condensation and Evaporation of Gas Molecules," "Metastable Atoms and Electrons Produced by Resonance Radiation in Neon," etc.

Among the many interesting, timely phases of Dr. Langmuir's observations are those concerning the present status and the possibilities of Soviet Russia's scientific research.

\$10.00

SCIENTIFIC AUTOBIOGRAPHY

And Other Papers

MAX PLANCK

These last writings of one of the greatest physicists of our time, include a fascinating story of his own personal and scientific development. Other subjects covered are: *True and fictitious issues in science; Meaning and limit of exact science; Physics and causality; Natural sciences and the religious world; etc.*

\$3.75

THE WORLD AS I SEE IT

RECORD FASTER, BETTER, EASIER LISTEN!

TRU-FIDELITY **PENTRON**
Alpha-Sonic
TAPE RECORDER



Saves Time, Increases Efficiency . . . of Teachers . Scientists . Students . Ministers . Doctors . Lawyers . Business . Professional People. Record lessons, conferences, speeches, sermons, research, radio programs and broadcasts, inventories, dramatic productions, home movies, special events, music. High fidelity recording, 1 hr. at $7\frac{1}{2}$ " per second. Automatic erasing. Super-het radio, highly selective. Portable, smart-looking, simple operation, trouble-free. Many exclusive features. You need this invaluable aid to success . . . send today for free booklet!

Other Popular PENTRON Products

WIRE RECORDER

— Tapes • Radio • Phone

roads, no houses. He must find the people, one by one, traveling afoot, on horseback or in canoe. He must carry his questionnaires in one hand and defend himself against wild animals, snakes or unfriendly humans with the other.

Cooperation of the people must be won

PUBLIC HEALTH

Reduce TB Germs in Air

► DANGER of getting tuberculosis by breathing the air-borne germs can now be greatly reduced with ultra-violet germicidal lamps, H. M. Vandiviere, director of bacteriology and parasitology research, State Department of Public Health, Atlanta, Ga., and his co-workers discovered.

The air was tested by a device called an impinger concentrator which breathes in one cubic foot of air per minute. The TB germs collected were exposed to direct irradiation under ultraviolet lights. It was found that the droplets ejected into the air by an infected person could be killed after 22 hours exposure at a distance of six and eight feet, he told the American Public Health Association in New York.

These germicidal lamps also kill about 70% of all other air-borne bacteria usually found in a room, Mr. Vandiviere pointed out.

This is a promising way of protecting workers exposed to TB, he said.

The experiments were made at the Battley State Tuberculosis Hospital with the cooperation of C. Edwin Smith, director, Battley State Hospital Laboratory, Rome, Ga., and Earl J. Sunke, director of Laboratories, State Department of Public Health, Atlanta, Ga.

Food spoilage by molds, which cause destruction running into millions of dollars every year, can also be reduced with the use of ultraviolet lamps. Spores of various molds are destroyed or made inactive in the air with ultraviolet, experiments conducted at Lighting Research Laboratory of the General Electric Company in Cleveland, showed. The work was reported to

so that they will be willing to disclose information to the census taker. This is a problem in the United States; it will be even greater in those countries unfamiliar with censuses and where the people look with suspicion on anyone coming around asking questions.

Science News Letter, November 5, 1949

the meeting by Matthew Luckiesh, A. H. Taylor, Thomas Knowles, and E. T. Lepelmeier of GE.

Aerial disinfection with the chemical, triethylene glycol vapor, is another effective method of ridding the air of both bacteria and viruses. But it requires that the relative humidity be within a range of 20% to 50%, otherwise the killing action of the chemical is reduced. This was pointed out by Dr. William J. Lester, Dr. O. H. Robertson, Saul Kaye and Edward W. Dunklin, all of the University of Chicago.

Science News Letter, November 5, 1949

Three "church boats," which were put into service after the war as a temporary measure for the benefit of northern Norway villages whose churches were burned by Nazi invaders, will probably be retained indefinitely.

Words in Science—

TRANSPARENT-TRANSLUCENT

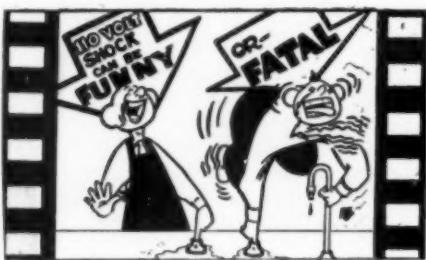
► TRANSPARENT is from two Latin words, *trans* which means "through" and *pareo* which means "appears." This word is applied to materials through which you can see objects clearly.

Translucent, from the same word *trans* and another Latin word *luceo*, "shine," describes material which lets light through but is not transparent.

If a substance is neither translucent nor transparent, it is said to be opaque.

Science News Letter, November 5, 1949

Safety in the Laboratory



A new filmslide comprising 33 hand-drawn cartoons, each driving home a powerful lesson in laboratory safety. Postpaid \$3.00.

VISUAL SCIENCES
Suffern, N. Y.
99-S

250 LUMINOUS STARS
Moon & 4 Planets

Have your own Planetarium on the ceiling of your den, bedroom or rumpus room!

"STARS" shine with outdoor realism AFTER turning off the lights.

Canned and Ready to Put Up

Only \$1.00 postpaid

Complete with Chart and Directions

"STARS" • 12,200 BLIX STREET

NORTH HOLLYWOOD, CALIF.



Three Christmas Gift Ideas for EAGER- MINDED CHILDREN

Kit No. 1

FUNDAMENTALS OF SCIENCE MAGNETISM AND ELECTRICITY

Equipment and instructions for 56 experiments on magnetism (making a compass for instance), static electricity, the electrophorus, the electro-scope, making a condenser, electric currents, making a galvanometer, and electroplating are contained in this kit.

Specifically, the equipment consists of: MAGNETISM—Horseshoe-type Magnet, Package of Iron Filings, Compass Card, Lodestone. STATIC ELECTRICITY—Sealing Wax, Metal Foil, Pyrex Test Tube, Fur, Cornstalk, Gold Leaf, Metal Disk and Sheet of Acetate Film for Electrophorus. CURRENT ELECTRICITY—Zinc Strip, Coil of Insulated Copper Wire, Carbon Rod, Sal Ammoniac. ONE PARTS BOX CONTAINING—a compass bearing, steel needles, steel pins for compass, gummed strips, soft iron nail, cork disks, ball bearings, straw, ball and pin for electroscope.

Kit No. 2

FUNDAMENTALS OF SCIENCE BLACK LIGHT AND GLOWING MATERIALS

26 experiments on fluorescence, phosphorescence, and glowing paints are suggested in the instructions for this kit, along with how to use fluorescent material in crime detection and how to get stroboscopic effects.

Specifically, the equipment consists of: SIX MINERAL SPECIMENS—Wernerite, Semiopal, Autunite, Green Fluorite, Willemite, Brown Fluorite.

SEVEN VIALS OF GLOWING MATERIALS: Fluorescent—Deep Yellow, Blue-Green, Cerise, Light Yellow; Phosphorescent—Light Green, Gray-white; Special—Greenish Gray-tan. One Vial of Gum Arabic, AND A fluorescent golf tee, a brush, a star map, a stroboscope, a picture (for coloring). One 110-Volt Argon Lamp—Rich in ultra-violet.

Christmas Order Blank

Science Service, 1719 N Street, N. W., Washington 6, D. C.

Please send, postpaid, to arrive in time for Christmas, FUNDAMENTALS OF SCIENCE KITS as indicated below, and include with each the special Christmas Card with my name on it as donor.

\$ _____ (\$4.95 per kit) is enclosed.

Send Kit(s) No. _____
direct to:

Gift from:

Name _____
(PLEASE PRINT)

Street _____

City and State _____

OR,
send Kit(s) No. _____ to me

City and State _____
Gift Card
to read from _____

Additional Names of Recipients can be put on a separate sheet and mailed with this coupon.

Kit No. 3

FUNDAMENTALS OF SCIENCE SOILLESS GARDENING

This kit has the instructions and the equipment for a soilless garden in the house or in an apartment without regard to weather. How to plant seeds, how to water and feed them, how to transplant, about water culture, sand culture, soilless gardening on gravel or cinders, about deficiency symptoms, about seedless fruit hormone, and how to produce seedless tomatoes, and how Hormodin is used—all this knowledge is in the Soilless Gardening Kit.

There are suggested experiments with sprouting seeds, and how to speed germination; on the importance of chemicals and how plant roots produce acid; about phototropism and geotropism; how to grow carrots upside down; how to perform tricks with plants (changing the length of day) and what total darkness does to plants; what light versus gravity does, colored light, and the use of colored tents.

Specifically the equipment consists of: One dozen green POTS (that you can assemble); COLORED CELLOPHANE sheets to be used in light and growth experiments; CHEMICALS your plants will need—potassium acid phosphate, magnesium sulfate, calcium nitrate, ferrous sulfate; Seven kinds of SEEDS—Russian sunflower, Earliana tomato, Globe radish, Dwarf nasturtium, Okra, Soybean, Ornamental gourds; Box of VERMICULITE; Plant Breeding Material—HORMODIN, SEEDLESS FRUIT HORMONE.

Each kit comes in a colorful, sturdy, wooden box with metal clasps, each kit is expertly wrapped for shipping in corrugated board and heavy kraft paper. Each kit contains the materials (as listed above) for scientific experiments and a book of instruction that is carefully written for easy reading. But most important, each kit contains hours of concentrated enjoyment and new worlds of understanding. Each kit costs \$4.95.

Fill in the coupon at the left, detach and mail today, indicating whether you wish the kits sent direct to your favorite mentally energetic child, or to yourself.

ORNITHOLOGY

NATURE RAMBLINGS

Pheasants

► THE pheasant belongs to a group of birds that is sometimes referred to as the true game birds. It bears a rather close cousinship to partridge, grouse and turkey, which all fall in this same category.

It is generally believed that the American bird is an introduction, not a native. Two kinds were introduced, the Chinese pheasant and the English ring-necked pheasant, so the lineage of today's ring-necked pheasant is undoubtedly mixed. The earliest known successful introduction of pheasant into the eastern United States was in 1887, probably as a replacement for ruffed grouse and bob-white. These native sporting birds suffered serious diminishment in many places as a result of cultivation of their native habitat and over-shooting.

The pheasants that have succeeded in becoming established thrive better in open country than the ruffed grouse, although the latter is better adapted to the climate,

especially in the northern states.

The long graceful tail, which in the male achieves a special glory, seriously hampers the pheasant in winter. When combined with its usual habit of roosting and feeding on the ground, the tail has been known to cause the bird's death. Dragging its tail along the ground after a wet snow-storm as it searches for food, the pheasant picks up snow which with a sudden drop in temperature frequently turns to ice. In the mid-west particularly, where wet snows turning into sleet are common, pheasants have been seen dragging heavy balls of ice that have formed on their tails. Sometimes this mass becomes frozen to the ground and the helpless bird is trapped.

Many an unwary hunter or walker in the woods has been half scared to death by the sudden explosion skywards of a

disturbed female pheasant. This marvelous stratagem is designed for the altruistic purpose of distracting attention while her young scurry to safety. This trick is employed not only when man comes too close for comfort, but whenever any of the pheasant's natural enemies approach the covert. Not only man, but cats, rats, weasels, great horned owls and other predators, are successfully outmaneuvered by this diversionary tactic.

The male does not waste his splendid raiment in monogamy. He struts and crows over a harem of hens who are his by right of battle. But if he revels in the privileges which go with his gorgeous attire, he also recognizes his responsibility. Whenever he discovers a supply of food, he gallantly summons the females to join him.

Science News Letter, November 5, 1949

• Books of the Week •

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W. Washington 6, D. C. Ask for free publications direct from issuing organizations.

ACETYLENE AND CARBON MONOXIDE CHEMISTRY—John W. Copenhaver and Maurice H. Bigelow—*Reinhold*, 357 p., illus., \$10.00. A critical treatment of the chemistry of acetylene under pressure.

THE AMERICAS: The Search for Hemisphere Security—Laurence Duggan—*Holt*, 242 p., \$3.00. The well-known former Department of State official had nearly finished this account of inter-American relations preceding the Bogota Conference when the work was interrupted by his untimely death. Minor touches to complete it were added by his wife, Helen Duggan, and by two friends, Marshall J. Wolfe and Herschel Brickell.

ANTARCTIC CONQUEST: The Story of the Ronne Expedition 1946-1948—Finn Ronne—*Putnam*, 299 p., \$5.00. The adventure story of an expedition that explored for the first time 250,000 square miles at the end of the world and made aerial photographs of 450,000 square miles, bringing back a wealth of scientific data.

BITUMINOUS COAL ANNUAL 1949: Facts and Figures—*Bituminous Coal Institute*, 192 p., illus., paper, 75 cents. A handbook of information and statistics on an important industry.

BOBWHITES ON THE RISE—Verne E. Davison—*Scribner*, 150 p., illus., \$3.75. A practical book on how to preserve the bobwhites which are at present dying out.

THE BUSINESS HELPER: For the Modern Man Operating a Small Business—Leslie C. Rucker—*Rider*, 133 p., \$2.00. A practical guide to help answer everyday questions that arise to give the little businessman headaches.

CATALOGUE OF BIRDS OF THE AMERICAS AND THE ADJACENT ISLANDS IN FIELD MUSEUM OF NATURAL HISTORY—Charles E. Hellmayr and Boardman Conover—*Field Museum of Natural History*, 358 p., paper, \$4.00. Part I. Number 4 of the Museum's Zoological Series, this completes the Catalogue of Birds. The senior author completed the manuscript before his death, but it has been amended by

the junior author who brought the bibliography up to date.

THE ELEMENTS OF GENETICS—C. D. Darlington and K. Mather—*Macmillan*, 446 p., illus., \$3.75. A concise textbook with a valuable glossary.

FIRST AID TEXTBOOK FOR JUNIORS—American Red Cross—*Blakiston*, 132 p., illus., \$1.00. A textbook for teaching first aid in schools and other organizations. A handy book to have in the house to consult "until the doctor comes."

GENETICS OF THE FOWL—F. B. Hutt—*McGraw-Hill*, 590 p., illus., \$6.50. With emphasis on chickens, this work summarizes and surveys the scattered and voluminous literature on heredity and variation in the domestic fowl.

GEOLOGICAL RESOURCES OF THE TRINITY RIVER TRIBUTARY AREA IN OKLAHOMA AND TEXAS—A. E. Weissenborn and H. B. Stenzel, Eds.—*University of Texas*, 252 p., illus., paper, \$2.50, cloth \$3.75. Report of a cooperative project of the U. S. Geological Survey and the Bureau of Economic Geology of the University of Texas. Important in relation to extensive program of conservation and development planned for that area.

GREEN FIELDS ARE GOLD—Joint Committee on Grassland Farming, 4th ed., 43 p., illus., 25 cents. Information in question-and-answer form on how to make money by putting easily eroded land into grasslands.

GUIDED MISSILES—A. R. Weyl—*Temple Press*, 139 p., illus., paper, 7 shillings and 6 pence (\$1.05). A short history of guided missiles up to the present time, and a forecast of the future, including a section on "defence against robot aggressors." Of British origin.

GUIDEPOSTS TO MENTAL HEALTH: 1, Life Begins; 2, School Days; 3, Teen Time; 4, Your Job; 5, Your Marriage; 6, The Middle Years; 7, The Golden Age—*New York State Department of Mental Hygiene*, each 6 p., paper, free on request to publisher, Albany, New York. A series of booklets intended to

Transparent Boxes



Offer maximum protection with complete visibility for specimens of all kinds, small parts, etc. Innumerable uses for these convenient boxes.

Model

A (15/16" x 15/16" x 3/4") 20 for \$1: 100 for \$4.00
B (1 1/8" x 15/16" x 3/4") 15 for 1: 100 for 5.00
C (1 1/8" x 1 1/8" x 3/4") 12 for 1: 100 for 6.00

(Postpaid if remittance accompanies order)

Send a trial order today

R. P. Cargille

118 Liberty St. New York 6, N. Y.

aid the public in achieving good mental health at critical periods of life.

HUMAN GROWTH: The Story of How Life Begins and Goes On—Lester F. Beck—*Harcourt, Brace*, 124 p., illus., \$2.00. Based on the educational film of the same title, this book tells how life begins and how boys and girls grow up. Helpful illustrations.

HYGIENE AND PUBLIC HEALTH: Earl B. Erskine—*Prentice-Hall*, 327 p., illus., \$5.00. A guide to personal and community health for liberal arts, engineering, architecture and commerce college students.

INDIANS OF THE URBAN NORTHWEST: Marian W. Smith, Ed.—Columbia, 370 p., illus., \$6.00. A study of the Coast Salish Indians of the coastal regions of the Northwest from Vancouver to Portland. A vast amount of data for the social scientist, including the personal narrative of a famous shaman.

INTRODUCTION TO SEMIMICRO QUALITATIVE ANALYSIS: C. H. Sorum—*Prentice-Hall*, 196 p., illus., \$2.00. A manual for a one-semester course for students with a background of general chemistry.

LEARNING ELECTRICITY AND ELECTRONICS EXPERIMENTALLY: Leonard R. Crow—*Scientific Book Publishing Co.*, 525 p., illus., \$4.40. Experiments designed to enable the student to learn by doing. Intended to show how the principles covered have a direct bearing on electrical devices in common use.

LIVING CHEMISTRY: Maurice R. Ahrens, Norris F. Bush, and Ray K. Easley—*Ginn*, 551 p., illus., \$3.60. A high-school text.

PROFILE ART: R. L. Megroz—*Philosophical Library*, 131 p., illus., \$7.50. A study of the use and significance of profile and silhouette from the stone age to puppet films. A pictorial history.

THE RACES OF THE AFRICAN WOOD-DOVE TURTUR AFER: A. L. Rand—*Chicago Natural History Museum*, 7 p., paper, ten cents. A survey of the species.

RADIOACTIVE TRACER TECHNIQUES: George K. Schweitzer and Ira B. Whitney—*Van Nostrand*, 241 p., illus., \$3.25. A guide for laboratory work and suggestions for utilizing radioactive tracers.

THE SAGA OF THE WATERFOWL: Martin Bovey—*Wildlife Management Institute Publication*, 140 p., illus., \$5.00. An account of what has happened to our ducks and geese since the enterprising pioneers first laid hands on what once was truly a hunter's Paradise. Beautiful illustrations.

SATURATING CORE DEVICES: Operating Principles and Applications: Leonard R. Crow—*Scientific Book Publishing Co.*, 373 p., illus., \$4.20. Not intended for engineers to obtain specific design and performance data, but to acquaint the elementary student in electric sciences with phenomena not to be found conveniently elsewhere.

THE SHOULDER ARCHITECTURE OF BEARS AND OTHER CARNIVORES: D. Dwight Davis—*Chicago Natural History Museum*, 20 p., illus., paper, 25 cents. His shoulder structure enables a bear to hoist the maximum possible weight up a vertical tree trunk.

THE STORY OF MAGNESIUM: W. H. Gross—*American Society for Metals*, 258 p., illus., \$2.00. One of a series prepared with the purpose of providing technical information on metals in readable form for the general public.

VISION: ITS DEVELOPMENT IN INFANT AND CHILD: Arnold Gesell, Frances L. Ilg, and Glenna Bullis—*Hoeber*, 329 p., illus., \$6.50. Based on a systematic study of vision development from the earliest days of life before birth up to the tenth year after birth. Study of a blind baby is included.

WELD DESIGN: Harry D. Churchill and John B. Austin—*Prentice-Hall*, 216 p., illus., \$6.65. A practical book for engineers telling how to design welded machine bases.

Science News Letter, November 5, 1949

DENTISTRY

Gums As Well As Cavities Need Care for Good Teeth

TO SAVE your teeth you must take care of the gums as well as having the cavities filled, facts presented to the American Public Health Association in New York, by Dr. Samuel Charles Miller, professor,

New York University College of Dentistry, suggest.

Gum diseases are responsible for over half of the teeth which are lost, he pointed out. Dentists refer to the condition as periodontal disease and believe that practically all children have it. Moreover, the disease carries into adulthood if not corrected.

A step in prevention is proper diet. This diet must meet more than nutritional needs for it has been found that a diet adequate in this respect still may cause great harm to the teeth and supporting structures because of its effect on these tissues, Dr. Miller stated.

He further outmoded methods in tooth-brushing such as rotary brushing, cross brushing, brushing on arising and before bedtime, saying they were a bad carry-over from the past. Effective brushing of teeth is after each meal, he declared.

Science News Letter, November 5, 1949

THE CHEMICAL ELEMENTS

Compiled by
PHILIP B. COLE, Ph. D.
PROFESSOR OF CHEMISTRY, ATLANTIC UNION COLLEGE

(Actual Size 18 x 30 inches)

WALL CHART

LATEST EDITION IS COMPLETE WITH 96 ELEMENTS
INCLUDING:
Francium, Promethium, Astatine, Technetium, Neptunium, Americium, Curium, Plutonium, Americium, Curium

CONTAINS THE FOLLOWING UNBELIEVABLY VAST AMOUNT
OF INFORMATION CONCERNING EACH ELEMENT

Periodic table (based on atomic number)
Weights (based on atomic weights)
Periodic table (based on atomic weights)
Group and family
Name in English, German, and French
Discovery Date, discoverer, nationality
Symbol and atomic number
Arrangement of electrons in orbits
Logarithm of atomic weight
Isotopes and valence
Crystalline form and color
Specific gravity or density
Melting and boiling points
Heats of vaporization and fusion
Heat conductivity
Coefficient of thermal expansion
Occurrence, preparation, and uses
The radioactive elements
The Uranium-Radium Series ($An+2$)
The Actinium Series (An)
The Thorium Series ($An+1$)
The Neptunium Series ($An+1$)
Synthesis of Transuranium Elements
Map showing production in U.S.A.
Distribution in earth crust, in human body, atmosphere, and in ocean
The Electrochemical Series
Critical constants for gaseous elements
Alchemical symbols
Index to the elements

USED BY MORE THAN 1500 UNIVERSITIES, COLLEGES,
HIGH SCHOOLS, AND INDUSTRIAL LABORATORIES

PRICES, prepaid
Single copy: \$1.50 Unmounted; 2 or more \$1.00 each.
10 or more for students \$1.00 each plus desk copy.
Mounted on mullion with rollers \$7.00.

(Money remitted if unmounted chart is unsatisfactory)

Order your copies today from
THE CHEMICAL ELEMENTS • BOX 315, S. LANCASTER, MASS.

• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N. St., Washington 6, D. C. and ask for Gadget Bulletin 490. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

FROSTING FOR WINDOWS is a paint that gives the same effect as commercial ground glass, permitting clear light to enter but providing privacy even under extreme illumination. Applied by brush or spray, it dries quickly to furnish a washable finish.

Science News Letter, November 5, 1949

UPHOLSTERY PROTECTOR, for automobile doors, is an easily-installed tough, transparent plastic sheet that comes in sets to fit many makes and styles of cars. Attached to each door separately with special tape and clips, it provides a grease- and flame-proof covering.

Science News Letter, November 5, 1949

SCREW-THREAD MEASURING DEVICE, inexpensive but accurate, consists of a connected pair of precision-ground triangular steel bars, with points truncated to clear the root of the thread being measured. The bars are placed one on each side of the screw-thread, and a micrometer measurement taken.

Science News Letter, November 5, 1949

TELEVISION ANTENNA, a reversible beam type suitable for use in areas lying between stations utilizing the same or adjacent channels, may be instantly re-



versed for reception from either direction without rotation. The "V" attachments, shown in the picture, provide uni-directional reception.

Science News Letter, November 5, 1949

PLASTIC BATH KIT, with zipper closure, packs flat, hangs by a loop, and is completely water-proof. Fittings include flexible plastic bottles, soap dish, pockets

for shower cap, wash cloth and razor, and tabs for toothbrush.

Science News Letter, November 5, 1949

TWO-CYLINDER PUMP, only two inches long, is a part of a compact electro-hydraulic temperature control system for hand-fired house heating plants. The kit, of which it is a part, includes a tiny motor and a thermostat. The installation, plugged into a basement outlet, automatically adjusts dampers.

Science News Letter, November 5, 1949

FLEXIBLE RUBBER MOLDS enable a hostess to cast miniature figurines in wax for use on the dining table. By melting old candles, the molds can be filled with melted wax, and the figure formed—colored, if desired, by a thin layer of colored wax applied as a coating.

Science News Letter, November 5, 1949

TOBACCO COMPOSITION, recently patented, contains a glycerin-like stable chemical known as alphamethylglycerine, a pure sample of which will absorb from one-half to two-thirds its volume of water in two or three days in a humid atmosphere. It is claimed to keep the tobacco at a proper moisture content.

Science News Letter, November 5, 1949

Do You Know?

Potash, for fertilizers, is to be obtained from the water of the Dead Sea.

Lice feed on the blood they suck from their victim; this causes the stinging sensation and itchiness that invite scratching.

Iran is almost self-sufficient in its production of most agricultural items needed to feed its people, except sugar and tea.

Although the Canadian aluminum industry is less than 50 years old, and the nation has none of the necessary raw materials to produce this metal, it is now sixth in dollar value on Canada's export list.

The Old World holds both the high and the low outdoor temperature records; the high is one of 136 degrees Fahrenheit recorded in Libya, North Africa, and the low was 90 degrees below zero at Verkhoyansk, Siberia.

We wish to serve you—

LET US ORDER YOUR BOOK

Don't Delay

getting that NEW BOOK you want to read. SCIENCE NEWS LETTER will gladly obtain for you any American book or magazine in print. Send check or money order covering regular retail price (\$5 if price is unknown and adjustment will be made). We will pay postage in the United States. You can attach a separate sheet, listing title, author, publisher, price, to your address coupon at right and mail to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C.

Book Order

SCIENCE SERVICE
1719 N Street N. W. • Washington 6, D. C.

Clip and enclose this address imprint whenever you write us to renew your SCIENCE NEWS LETTER subscription, change address, order other materials, etc. It identifies you as one of the SNL family. Lower line date is expiration. Allow three weeks for address change.

1719 N Street N.W.
Washington 6, D.C.
U.S.A.
TELEGRAMS: SCIENCE
TELEPHONE: 2-1111
\$5.00